ITS

N.C. Department of Commerce

Office of Information Technology Services

State of North Carolina
Office of Information Technology Services

Enterprise Approach for Managing Information Technology
Statewide Strategic Information Technology Initiatives

April 2000

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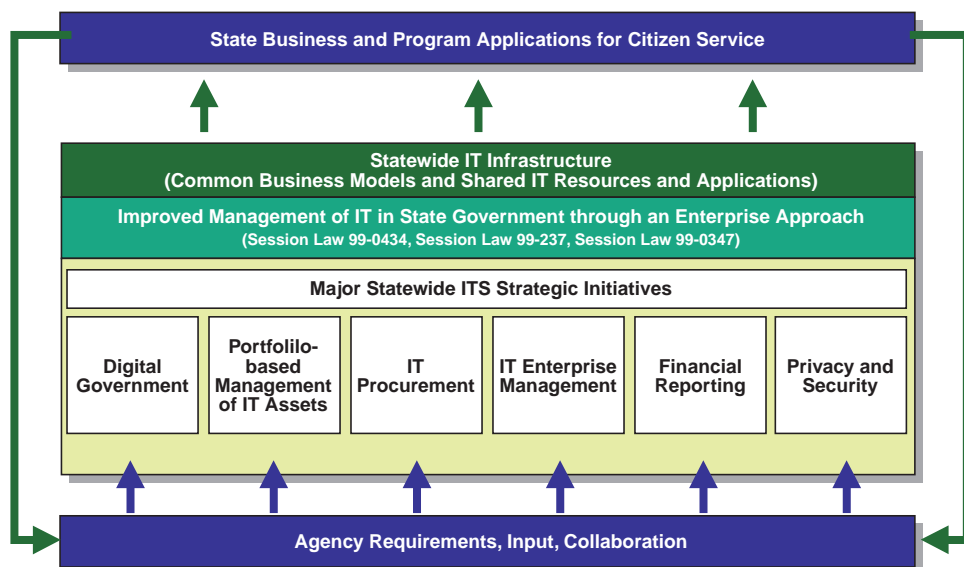**Agency Requirements, Input, Collaboration**

Figure 1: Statewide Strategic Initiatives

Background

Government is experiencing demand for more economic, efficient and effective operations. External dynamics are reshaping the political environment. These include globalization of commerce, rapid technological advances, increasing security and privacy concerns, evolving demographics, changing societal values, and increasing fiscal pressures. Universal, profound, and constant change is a hallmark of the information age and the resulting new economy. Government is undertaking new, broad-based initiatives to accommodate these changes, meet these demands, improve performance, enhance productivity, and increase accountability.

Information technology is transforming how we communicate, learn, access and use information, conduct commerce, practice health care, and enhance economic growth. In the private sector, electronic commerce is changing markets, industry structures, products and services, customer values and behavior, and jobs. For government, the Internet offers the potential for

providing new, more responsive, and more efficient ways to deliver services and provide information to the public. It allows citizens to participate more directly in the democratic process.

Moreover, the public is demanding the same level of self-service capabilities, convenience, and cost savings from government that it receives from private industry. This includes citizen expectations of immediate and personalized access and response to services, anytime and anywhere. Government must take advantage of and maximize the benefits from information technology to accommodate the increasing performance and accountability expectations of citizens. At the same time, it must address both newly emerging and long-standing challenges.

Through legislative action and executive leadership, North Carolina state government recognized the incredible changes in information technology. It is responding to the tremendous potential for transforming the state's methods and processes for serving citizens

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through significant actions. The 1999 General Assembly passed three pieces of legislation that: (1) Redefine the way state agencies conduct business in the area of information technology; (2) Restructure the governance of technology; and (3) Strengthen the reporting of and accountability for information technology investments and expenditures.

In early 2000, Governor Hunt appointed a Statewide Electronic Commerce Steering Committee to provide overall direction and coordination for implementing electronic commerce in state government. Consistent with this approach, in April, the Governor announced the North Carolina @ Your Service - ncgov.com initiative. With NC @ Your Service - ncgov.com, the state will become part of a unique collaboration with a private business leader in e-commerce to implement and operate the state's citizen, business, employee, and local government portals. The actions by both the legislative and executive branches emphasize improvement of the management of information technology assets in state government through an enterprise (i.e., statewide) approach for planning, implementing, operating, and retiring technology investments.

Enterprise Approach for Managing Information Technology

It is necessary to integrate systems and business processes so that electronic commerce practices and new technologies can work effectively. The state recognizes it can realize significant savings to taxpayers, reduce application development times, and decrease implementation and operation risks by adopting an enterprise approach for managing information technology. In particular, a study sponsored by ITS pointed out that the business methods and processes employed and the technologies needed for e-commerce and other applications are the same for many agencies and programs. Thus, significant benefits are obtainable from employing common business processes and sharing a common technical infrastructure that result from:

- Synergy - Combining fiscal, personnel (skills and knowledge), and technical resources to obtain collectively, capabilities that a single agency or program could not accomplish individually.

- Leverage - Building upon existing infrastructures, experiences, and methods and processes to develop new capabilities faster and cheaper.

- Economies of scale - Reducing unit costs by re-using common technical components and sharing the same technical facilities.

- Critical mass - Building a significantly robust infrastructure for addressing scale, flexibility and extensibility challenges.

An enterprise approach encompasses a statewide perspective with two basic themes:

1. Individual applications using a common shared technical infrastructure and services to reduce development time, provide reliability of operations, enhance communications and integration, and realize economies of scale to achieve cost-effective implementation and operation.

2. Agencies defining their preferred technical architectures (within the statewide technical architecture) and for the design of individual applications (within agency technical architectures). It also includes individual applications conforming to minimum standards to ensure the parts work well, work together, and provide for scalability and adaptability (i.e., can be expanded, modified and incorporate new technologies cost-effectively and rapidly).

The "enterprise approach" is analogous to planning for a community. Where applications are like small and large single family houses, multifamily housing, light industry, heavy industry and common service buildings such as churches, schools, and shopping centers. The water and sewer, electricity, telephone, cable TV, and street and highway networks are common, shared infrastructure. There are various levels of choices in the housing units,, but they all must meet minimum building codes and all structures connect to the common shared infrastructure. Through the telephone and highway infrastructures, individual communities operate efficiently and are connected and coexist with each other (such as the state being connected to the federal and local governments).

Summary of Legislation

The three items of legislation guiding the enterprise approach for improving the management of information technology in state government are:

- Session Law 99-0434: The Electronic Payment/ Information Technology Act of 1999; sponsored by Senator Eric Reeves and Representative Joe Tolson

- Session Law 99-237: 1999 State Budget, sponsored by Representative Ruth Easterling; and

- Session Law 99-0347: Information Resource Technology Commission Act of 1999, sponsored by Representative William Owens, Jr.

The Electronic Payment/Information Technology Act of 1999 addresses statewide governance issues and mandates several initiatives related to information technology. The legislation covers the following governance items. It establishes an Information Technology Management Advisory Council, comprised of high-level program and technical representatives, to provide business-oriented management for technology issues. It also strengthens the role of the Information Resource Management Commission, the senior executive body responsible for statewide oversight of information technology, by adding to its membership and increasing its policy-making role. The legislation defines the operational and standards-setting duties of the Office of Information Technology Services (ITS) and assigns procurement responsibility for the state's information technology assets to ITS.

The Electronic Payment/Information Technology Act of 1999 mandates a number of initiatives. It provides for the business-based portfolio management of the state's information technology assets through the integration of the state' planning, budgeting, and project management activities. It mandates that the Office of State Budget and Management, the Office of the State Controller, and the Office of the State Auditor develop a capability for unified and consistent budgeting and reporting of information technology costs. The legislation requires that ITS develop and implement a comprehensive plan for the management of the state's distributed information technology assets, including personal computers, local area networks, servers, mobile computers, communications equipment, and software and other technology related assets. Finally, it facilitates electronic commerce in state government by authorizing state agencies and local governments to accept credit/debit cards for products and services.

The 1999 State Budget mandates the establishment of formats, contents, and guidelines, as well as the quarterly reporting of information technology budgets, costs, and staff positions. The Information Resource Technology Commission Act of 1999 codifies the Information Resource Management Commission's project certification policy, which states that the Information Resource Management Commission must approve any information technology investment over $500,000 or that meet other defined criteria. Certified projects must comply with the Information Resource Management Commission's project management and quality assurance program. This program includes a comprehensive sign-off and review process; monthly status reporting; and periodic, independent, external quality assurance reviews.

Summary of Initiatives

There are six strategic initiatives ITS is implementing in collaborative partnership with state agencies, local government, and private industry to manage information technology from an enterprise approach. The initiatives have two objectives. The first objective is to maximize the use and value of information technology assets for reducing the cost of government and increasing services to citizens. The second objective is to improve the management of information technology in state government so these investments provide the greatest benefits at the least cost. The six initiatives build upon preceding statewide endeavors, primarily the state's renowned technical architecture and award-winning project management and quality assurance program. Other activities that provide a foundation for the current initiatives are: common data standards (federated data), service broker, interface engine, application portfolio management system, asset insight inventory system, enterprise directory services, and information protection and privacy policies. The six new initiatives are:

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Digital Government

Digital government is the North Carolina @ Your Service - ncgov.com initiative. It involves a: statewide governance structure; a project office management approach; a series of foundation projects; and a partnership with private industry to employ an enterprise focus for implementing electronic commerce in state government. The enterprise approach emphasizes the following key principles for enabling the state to offer advanced e-commerce capabilities to its citizens in an expedited and cost-effective manner:

- Determine a consistent and citizen-centric approach for citizens and businesses to transact business with the state.

- Develop a shared vision among all agencies for conducting electronic commerce, including common business models and a shared technical infrastructure.

- Create a standards-based approach for implementing electronic commerce applications.

The technologies of e-commerce may be applied to address any of the following situations: customers waiting for information or services, the exchange of money for products (licenses, permits, etc.), paper-based processes, information access/retrieval for research activities or to provide knowledge, and government and citizens communicating to conduct business or offer/receive information. By themselves, e-commerce technologies will not provide full benefits. Business processes must be re-engineered, information must be accessed and exchanged electronically, and applications must be integrated to achieve maximum effectiveness and efficiency in delivering services. The enterprise approach for implementing electronic commerce in state government emphasizes and follows the "one way-one time" principle to expedite implementation, reduce duplication and minimize costs.

Major projects for digital government currently underway include:

- Selecting an electronic payment processor (credit/debit card and electronic check) and implementing this capability with an enterprise model.

- Implementing, operating, and hosting four state portals - citizen central, business central, employee central, and local government central.

- Implementing a public key infrastructure to provide authentication and encryption for both internal and external communications and transactions.

- Implementing an electronic data interchange capability that can be used by the several agencies requiring this facility to conduct business.

- Implementing an e-procurement solution for the state.

- Establishing common e-commerce services and capabilities that can be used by multiple agencies. These include e-forms and e-auctions.

There is a continuum in the stages of capabilities for electronic commerce. The continuum begins with establishing a web presence. The next step is citizen interactions through the Internet. This is followed by web transactions on the Internet. The final stage is when business transformation occurs because of the use of the Internet. Each stage is more complex than the preceding one. Each offers more sophisticated and complete capabilities for citizen self-service and provides greater potential for implementing productivity improvements and processes that save taxpayer dollars. The primary intent of the digital government initiative is to move state government through this evolutionary continuum to business transformation.

Portfolio-Based Management of Information Technology Assets

The portfolio-based management of information technology assets has three basic components:

- Streamlining the planning and budgeting process for information technology investments.

- Identifying technology investment opportunities and selecting those investments that maximize the value of both agency and state portfolios of technical assets.

- Managing the life cycle of information technology assets to ensure that maximum benefit is realized from each, so that the agency and state portfolios of technical assets provide the best value to taxpayers.

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The primary intent of portfolio management is to identify and evaluate technology investments and manage applications and other technology assets from a total entity (portfolio) perspective. That is, it is necessary to define how each investment fits in with the total portfolio and contributes to the whole, rather than just looking at the individual stand-alone merits. The contribution of an individual investment to the overall portfolio may be more important to an agency or the state than its singular value. Therefore, this contribution to the portfolio must be one of the key evaluation and selection criteria for IT investments.

Portfolio-based management of IT assets has five objectives:

- Identify and implement infrastructure and enterprise information technology assets on a statewide basis to obtain economies of scale through sharing common facilities.

- Identify individual applications that can serve multiple agencies, rather than implementing and operating multiple similar applications for several agencies.

- Assess individual agency technical infrastructures from a statewide perspective so that each agency's assets integrate with and make use of the common statewide infrastructure.

- Develop the processes and infrastructure needed to prepare and maintain an accurate and complete inventory of all information technology assets.

- Identify and evaluate future agency technology investments. Analyze present agency assets in a manner that achieves the greatest returns. Ensure that investments fit into a coherent agency technical infrastructure. Combine investments with other agency technical assets to fulfill strategic business missions and encompass long term planning horizons for the agency and the state.

Portfolio-based management provides the processes and information necessary to make broad-based technology investment decisions that avoid a hodge-podge of point-solution applications and assets that may be redundant, do not integrate, are not scaleable, and/or are expensive to maintain.

IT Procurement

Procurement is an essential component of the cost-effective management of information technology assets. Its processes, concepts, and activities must be closely coordinated with those of planning and budgeting, implementation/deployment, operation/use, and retirement/disposal. Close coordination streamlines the asset implementation activity and is necessary to achieve maximum benefits and taxpayer savings from information technology investments.

Procurement reform addresses three major challenges. These are: (1) Streamlining the purchasing process - necessary to reduce the cycle times for implementing assets; (2) Obtaining quality assets at economical prices - necessary to realize maximum returns from investments and benefits to the state; and (3) Enforcing standards and specifications - necessary to lower total cost of ownership. Best value techniques and concepts are being implemented to addresses these challenges. Key components of this approach are:

- Consider total cost or value of ownership (installation to retirement/disposal) rather than just purchase price in evaluating vendor offerings. For example, lower prices may be adversely offset by higher maintenance and operating costs or the low price may mean lower quality or reduced benefits such as the inability to inter-operate with other products or applications.

- Allow and encourage vendors to offer innovative and creative solutions to business problems, rather than over-specifying technical requirements.

- Recognize purchase or implementation cost as only one (albeit it an important one) of the many factors that must be evaluated in selecting a product or vendor. Other factors include: vendor past performance, capability of proposed solution to satisfy business issues, appropriateness of project management approach, risk analysis of proposal's potential for success, taxpayer benefit, and total life cycle cost.

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In addition to best value methodologies, procurement reform incorporates the following concepts and practices:

- Aggregate demand from multiple sources to obtain maximum volume discounts.

- Comply with enacted standards and specifications to ensure products operate as prescribed, work together as desired, and can be maintained economically to maximize value and minimize total cost of ownership.

- Employ knowledge-based procurement by closely integrating the various skills involved, such as technical, legal, negotiating/contract management, and fiscal.

- Establish partnerships with customers and other review/approval bodies to streamline and accelerate the purchasing process.

- Implement shared partnerships with vendors to provide financial incentives for successful asset life cycle management from planning/purchase through retirement/disposal that achieves cost savings for the taxpayer.

IT Enterprise Management

The fast changing nature of information technology over the past decade has transformed the hardware/software and communications infrastructure from mainframe-based central data centers to PC workstations, servers, routers, and other equipment physically located throughout an enterprise. Because of its more distributed nature and complex infrastructure, today's information technology components are difficult and costly to administer and manage. Their total cost and value is difficult to assess. IT Enterprise Management focuses on these distributed technology assets and encompasses the policies, processes, organizational structures, and support tools needed to manage these assets from the planning stages to the end of their asset life cycles. The intent is to:

- Manage technology assets so that their strategic application is based on business requirements, while maximizing computing power and fulfilling operational needs in the most economic manner.

- Meet agency requirements, while leveraging the purchasing power for volume discounts to achieve best value.

- Improve customer support and operational availability to obtain the greatest benefits from these investments for providing services to citizens.

The key to the IT enterprise management effectiveness is:

- Applying enterprise standards to comply with the state's technical architecture. This ensures components are integrated to achieve enterprise objectives, performance meets business needs and technical requirements, and infrastructure is common to facilitate support/maintenance and provide minimum total cost of ownership.

- Improving user interactions and providing higher service levels by establishing a consolidated service center (help desk). The service oversees operational support, gives complete and easy-to-understand menus of service offerings and performance expectations, measures the effectiveness of services performed, and provides a single point of contact for users to request services or report problems.

This initiative enables the establishment of enterprise level services that free agencies to focus on improving business functions. It coordinates costly technical support requirements to minimize purchase prices, reduce operating and maintenance expenses, improve retirement values (reduce disposal costs), and enhance asset performance results to maximize the use of the tax dollars that are spent.

In summary, this initiative establishes the tools, processes and concepts to minimize total life cycle costs of distributed technology assets. These costs include: (a) Capital, such as purchase/implementation price; (b) Technical support, such as install, monitor, fix, update, maintain, etc.; (c) Administrative support for purchasing and contracting, and (d) End user support, such as training and assistance.

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Financial Reporting

Budgeting and accounting for information technology expenditures and the reporting of costs and fiscal benefits are essential parts of managing these investments. To accomplish this, it is necessary to report total statewide budgets and costs by key management categories and to report total costs by major projects or investments. Total costs encompass initial planning stages through implementation, operation and eventual retirement/disposal. The first objective is met through the quarterly statewide Information Technology Expenditures Report. This report combines information from the state's personnel management and accounting systems. The second objective is addressed through the use of unique budget fund and project codes in the North Carolina Accounting System. The Office of the State Auditor, the Office of the State Controller, and the Office of State Budget and Management are working collaboratively to implement enhanced financial reporting and accountability for information technology investments.

Privacy and Security

Nothing holds as much promise for improving services to citizens and reducing the cost of government as the Internet. However, it cannot be successful unless the citizens have confidence that the state can ensure the confidentiality of records, the privacy of individuals, and the integrity of transactions. Policies and procedures must be developed and technical capabilities must be implemented to address the following areas of information protection and privacy and to achieve and retain the trust of the public:

- Access control - Determine what data or applications a person can reach.

- Identification and authorization - Determine who can be connected to a particular device.

- Data confidentiality through encryption - Protect the confidentiality of transmitted information.

- Data integrity - Guarantee that data has not been changed since its last official update.

- Non-repudiation - Prohibit the recipient of a message from denying having received it or to disallow a sender from denying having sent it.

1. OVERVIEW - ENTERPRISE APPROACH FOR THE MANAGEMENT OF INFORMATION TECHNOLOGY

When managed properly, information technology is an effective tool for delivering high quality, responsive, and cost-effective government services and is instrumental in improving the performance and accountability of programs. New and emerging technologies for electronic commerce, especially Internet communications and web technologies, offer the potential for fundamentally changing the way citizens and businesses interact with government. Information technology can offer the same radical transformations and quantum leap improvements for government as it is doing for the private sector by drastically transforming operations and relationships while providing a cost effective use of taxpayer dollars. It is a major force in shaping the future of government.

North Carolina state government is adopting an enterprise approach for improving its management of information technology. This statewide perspective and its related six key initiatives have been mandated by far-reaching legislation and promulgated by executive branch directives from the Governor, especially for digital government. The enterprise approach for managing information technology will enable the state to improve organizational efficiency, increase program effectiveness, and provide greater accountability for expenditures and results.

The effective management of information technology involves three primary objectives. First, investments must be identified, evaluated, and selected so expenditures are made on the right purchases. Individual investments must be made so that they maximize the returns to the state's total technology asset portfolio. Second, investments must be implemented and operated effectively and economically. The fit with the state's technical architecture, the purchase under IT procurement reform, the implementation under the state's project management and quality assurance program, and the support of assets under the IT enterprise management initiative are essential imperatives. Third, information technology assets must be employed in ways that benefit the business. The use of IT enabling the reengineering of business processes, streamlining

interagency communications for programs crossing organizational boundaries, and creating new service delivery methods are key considerations.

The improved management of information technology in state government through an enterprise approach is a theme that is essential to government reform in the twenty-first century. Tightening budgets, increasing citizen demands, growing technology and business complexities, and expanding uses of the Internet necessitate the restructuring of the organization and refocusing of the priorities and efforts for managing technology investments. An enterprise approach provides the greatest opportunity for the Office Information Technology Services (ITS), in collaboration with state agencies, local government, and business partners, to maximize the benefits of the technology revolution and electronic government.

E-government, or digital government, has powerful potential. It is critical that the impact of electronic commerce and what it means for government be fully recognized. At the same time, initiatives, strategies, and successes cannot be considered and evaluated without an appropriate understanding of the unique nature of information technology at this important juncture in the information age.

Section two discusses the legislative mandate for the strategies and initiatives described in this document. Section three describes the six key initiatives for the improved management of information technology in state government through an enterprise approach. These separate, but closely related, initiatives are essential for managing technology in today's complicated, expensive, and fast-paced technology and business environments. With an enterprise perspective, each initiative will supply the infrastructure of resources, processes, and concepts for ITS, state agencies, collaborating local governments, and business partners to realize maximum value from technology investments by enhancing benefits and reducing costs. Section four provides a summary of the initiatives.

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Digital Government

Technology is revolutionizing the way citizens live and work. North Carolina is making a significant commitment to realizing the tremendous potential of technology to dramatically improve its place in the global economy. The Internet is forcing rapid, constant, and profound changes in the ways virtually everyone performs jobs, conducts business and fulfills obligations as citizens in a democracy.

Not so long ago, computer technology, while relevant, could be largely ignored in the professional and personal environment - but no longer. Information technology, especially the recent explosion of the Internet and e-commerce, has transitioned from being a competitive advantage to a competitive necessity. This monumental shift requires a change in how business and government approach the management of information technology and how both conduct business in the 21st century.

The characteristic that makes e-commerce more powerful than any past technology trend is the ubiquity of the Internet. Location does not matter. Time and distance are almost literally reduced to zero. Nearly anyone, as long as they have a PC and a modem, can open a storefront with instant access to the global marketplace. This is a critical component for North Carolina with its large rural geography.

Electronic commerce allows industry and government to operate more efficiently, provides innovative services, offers novel products, and responds quickly to the public's shifting preferences and expectations. Citizens demand simple, fast and personal ways to access government information, receive services, order permits and licenses, pay fees and taxes, and file information. The protection of privacy and the security of information are especially challenging under the new technical environment. Citizens must have confidence that their online communications with the state are secure and their privacy is protected.

While opportunities for e-government are great, the challenges are major. The rapid introduction of new technologies is straining the ability of our political, business, social, and judicial structures to adapt. These impediments must be addressed and must not thwart the ability of the state to offer less time consuming, less expensive, and less mistake-prone transactions for its citizens.

To lead the nation in achieving digital government, North Carolina is adopting an entrepreneurial, business-like, enterprise approach for implementing electronic commerce in state government. In announcing the North Carolina @ Your Service - ncgov.com initiative, Governor Jim Hunt said, "North Carolina is poised to be a global leader, harnessing new technologies to make government work simpler, faster and better for our citizens, businesses and state employees."

Information Technology

Along with the increased use of the Internet, and partially driven by it, there is unrelenting technology-driven change that presents an avalanche of new opportunities and challenges. Information technology is moving beyond the role of mere infrastructure in support of business or political strategy. The advent of the information age compels managers and senior executives to ensure that technology is an equal component of future strategies and plans. The way technology is managed and the results of its implementation and use have a significant impact on the performance and success of an organization - public or private.

While some uses of technology merely increase the efficiency of routine work, strategic investments can radically restructure how an organization relates to its customers, employees, and other entities in its political and business environments. In this regard, information technology has a significant impact on government and can be used to reinvent it. Technology can promote more effective and efficient delivery of services, provide increased accountability to citizens, offer easier access to useful information, enable enhanced participation in the democratic process, present new opportunities to encourage economic development, and make available the potential to improve society through telemedicine and distance learning.

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An enterprise approach for planning and managing shared technology services, resources, and infrastructure is necessary for maximizing the benefits from technology investments, to fulfill increasing citizen expectations, and to provide mission critical business functions. This requirement is particularly strong in the e-government environment where rapid development and fast technology obsolescence require a communications network, computing infrastructure, and common application services that can be shared to accelerate deployment, improve reliability, and minimize costs.

Managing Information Technology to Maximize Benefits from Investments

Information technology, a mission-critical business resource, is an increasingly significant business investment. In 1999, information technology consumed an average of 1% of industry revenues. In North Carolina, state agencies and universities spend more than $600 million on information technology annually, or 3% of the state's approximately $20 billion budget. This level of expenditures emphasizes the need for managing information technology more carefully, especially in the public sector, to achieve the greatest benefits at the lowest cost to the taxpayer.

IT as a Percent of Revenue, by Industry – 1999

Industry

Construction & Engineering	
Metals & Natural Resources	
Hospitality & Travel	
Manufacturing	
Average	
Health Care	
Insurance	
Financial Services	
Telecommunications	
Banking	

0.00   0.50   1.00   1.50   2.00   2.50
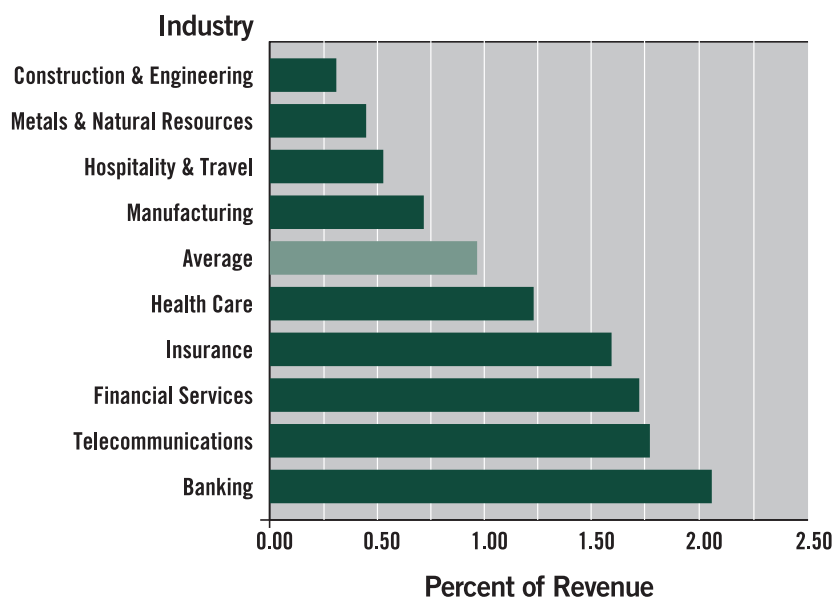
Percent of Revenue

Figure 2: IT as a Percent of Revenue
Source: Meta Group

While the costs of some components of information technology have fallen over time (performance/price doubling every 18 months), overall expenditures and investments are increasing at a rapid rate. Technology is becoming a more essential component of business and is incurring a greater percentage of overall costs.

Expenditures per employee on IT have skyrocketed - they are currently estimated to be between $5,000 - $10,000 per employee in state government. This increasing cost adds pressure on the state's already stretched budgets.

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IT Spending per Employee
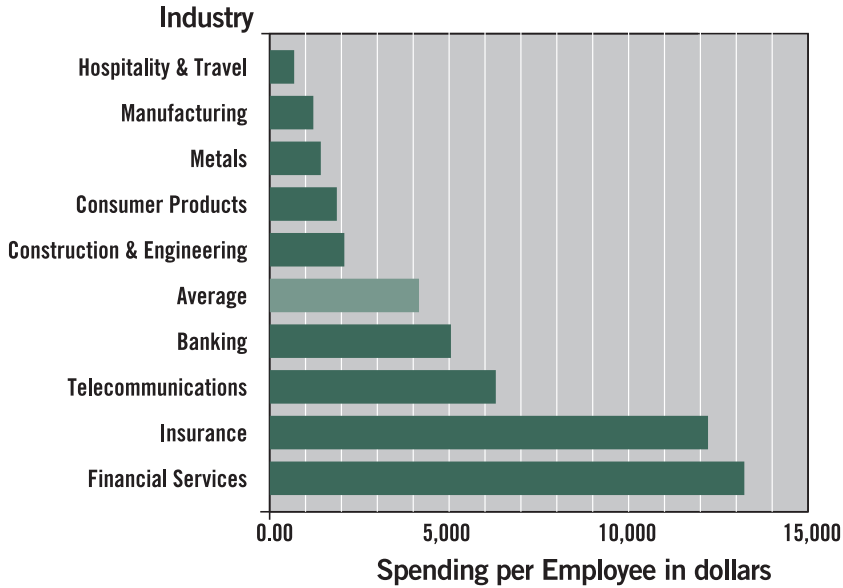
Figure 3: IT Spending Per Employee
Source: Meta Group

In spite of these upwardly spiraling investments, over time, the state's information technology budget has remained constant. Therefore, the state must aggressively pursue industry best practices and other cost-cutting approaches through the IT enterprise management and IT procurement initiatives as the Internet virtually dictates the increasing use of technology.
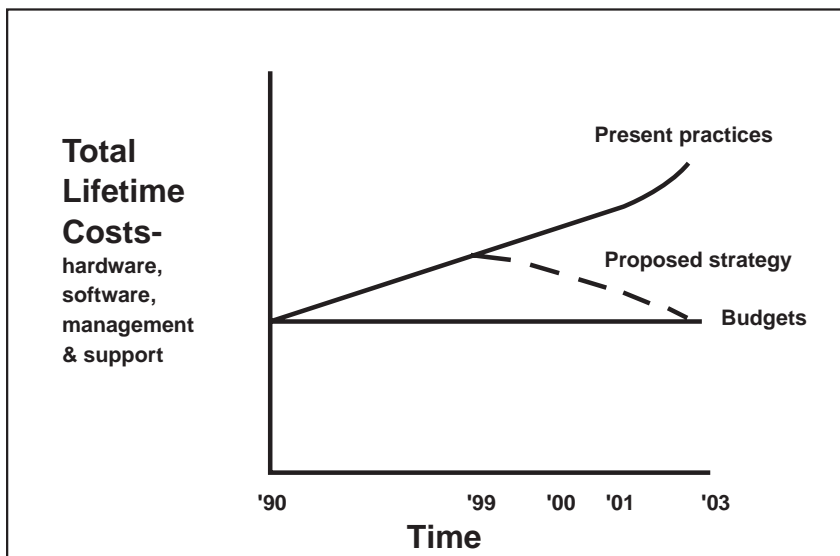
Figure 4: Cost Containment

![ITS logo]

Fortunately, there are many opportunities for improving the cost performance of these assets and obtaining greater benefits from them. E-government provides the prospect for cost savings through reduced paperwork, streamlined processing flows, self-service techniques for completing transactions with citizens, new approaches for conducting business with vendors and customers, and more efficient inter-agency communications for performing common program responsibilities. The IT enterprise management, IT portfolio-based management, and IT procurement initiatives provide remarkable opportunities for cost savings through making management decisions based on true total costs of ownership, leveraging buying power, increasing efficiency through the sharing of common resources, etc.
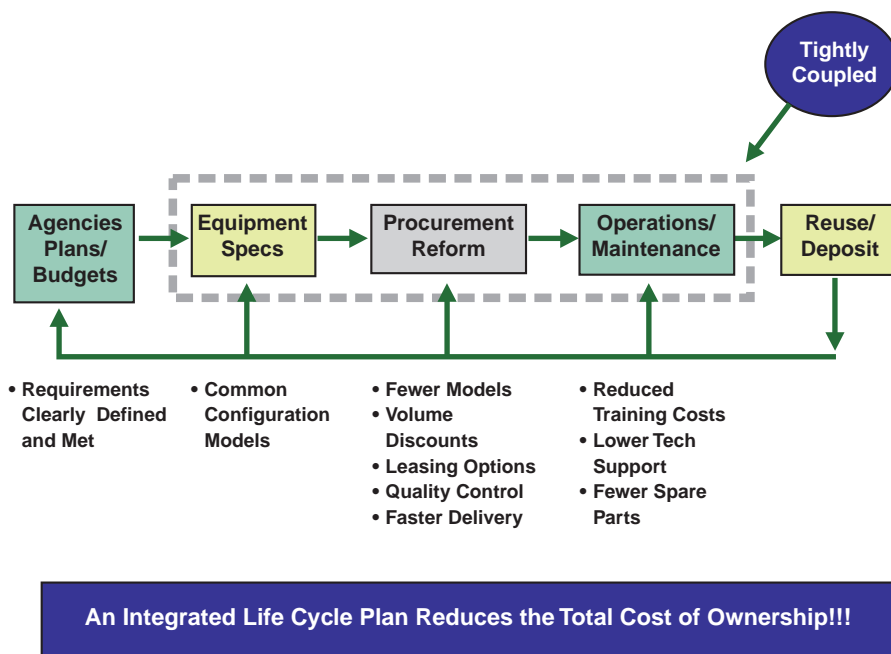
Figure 5: Total Cost of Ownership

Diagram flow: Tightly Coupled →

Agencies Plans/Budgets → Equipment Specs → Procurement Reform → Operations/Maintenance → Reuse/Deposit

- **Requirements Clearly Defined and Met**

- **Common Configuration Models**

- **Fewer Models**
- **Volume Discounts**
- **Leasing Options**
- **Quality Control**
- **Faster Delivery**

- **Reduced Training Costs**
- **Lower Tech Support**
- **Fewer Spare Parts**

An Integrated Life Cycle Plan Reduces the Total Cost of Ownership!!!

Raising the Bar by Changing Organizational Culture

To survive in the new arena created by the maelstrom of information technology innovations, especially the rise of the Internet, a shift in everything - from organizational culture, to management approaches, to how technology is viewed in the scheme of government priorities - is essential. Historically, it was sufficient for business executives to work as a "settler" where the status quo in the management of technology could frequently be maintained with occasional forays into the world of the "pioneer" where some change in perspective and urgency was necessary. Once the infrequent change in technology occurred, the new status quo could be safely assumed. Today, to survive in the ongoing, seismic shifts in both the technology and business arenas, managers must be able to blaze new trails as "explorers" and to accept change and risk as often the only constants in the work environment.

Similarly, organizations viewed information technology as a back-office operation for supporting business functions and a place to emphasize cost containment. In some instances, computers were important, but not integral to an organization's core business functions. Now, if an organization does not view information technology as a major business investment - as a critical, integrated component of every aspect of its business function - it will fail. Business leaders must understand technology's role in their success, and technology leaders must recognize the business functions that drive their technology decisions.

Raising the Bar

Explorer
Re-structure, Re-think

Strategic
Front Office, Integrated Investment

Enterprise Approach
Sharing Resources

Collaborative
Interdependent

Where we need to be

| **Pioneer** *Change Agent* | **Important** *Essential* | **Communication** *Coordinate Capabilities* | **Interested** *Supportive* |

Where we've been

| **Settler** *Status Quo* | **Back Office** *Maintenance Cost Containment* | **Line of Business Approach** *Separate Components* | **Autonomous** *Independent* |

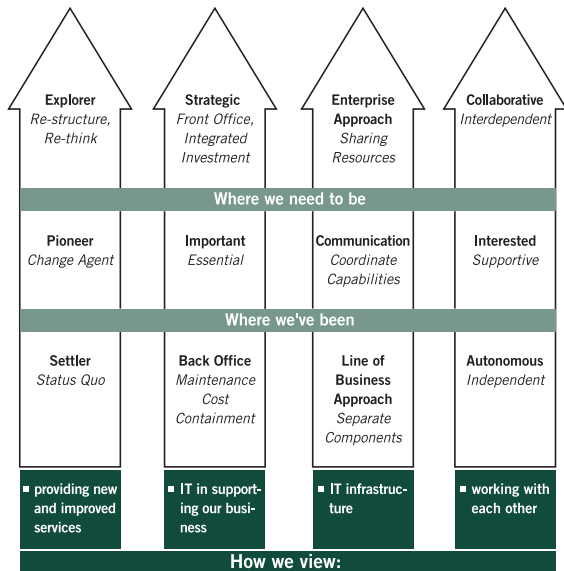| ■ providing new and improved services | ■ IT in supporting our business | ■ IT infrastructure | ■ working with each other |

How we view:

Figure 6: Raising the Bar

For many years, state government computer systems operated autonomously based on line of business or program applications, thus creating stovepipe systems and disparate, stand-alone services. While communication and coordination occurred when it was mutually advantageous, for example for mainframe processing and the use of the state's integrated information network for communications; technical infrastructure and personnel resource sharing was not the norm. Now, technology investments are more complex and costly to operate and support; information exchange among agencies, programs, and governments is becoming essential for delivering services in many areas of government; budgets for technology are tighter; and citizens are demanding one-stop, self-service anytime and from any geographic location worldwide.

Escalating business challenges, unrelenting fiscal pressures, increasing accountability requirements, and greater reliance on technology are forcing state executives to modify their perspectives on the management of information technology substantially. This is especially true because of technology's positive impact on enabling new services, supporting agency missions, accomplishing business goals and objectives, providing a shared infrastructure, and encouraging collaboration for making use of common business models and sharing common components.

The Office of Information Technology Services as a Collaborative Partner

In 1983, the General Assembly created a central data center. The Office of Information Technology Services evolved from that legislation, but it is a world away from its beginnings. ITS has a new name and a new attitude. ITS recognizes its instrumental role as a facilitator in the collaborative partnership that will move the state through this new and exciting IT adventure. North Carolina's goal is to become the leader in digital government and IT. To work with the agencies and local governments to achieve these goals, to comply with senior executive department direction, and to meet new technology related legislation, ITS has launched six strategic initiatives. The success of these initiatives is essential to the implementation of digital government and the improved management of information technology in state government.

ITS

ITS provides services in the following areas:

- Implementing a number of initiatives, driven by the industry, citizen demands, and legislation that have the potential to elevate the state to a new level in its electronic interactions with citizens and businesses and to achieve costs savings and efficiencies.

- Working collaboratively with the agencies to understand their vision, strategies and plans, to set statewide policy and direction, and to support them in achieving their goals through quality assurance support, audits, planning support, and project certification.

- As a service bureau, providing infrastructure support that reduces costs, improves operations, and adds value to the services delivered to citizens. ITS provides computing and telecommunications services, maintains and develops line of business applications,

and provides technical assistance in all of these areas. North Carolina is highly regarded by the rest of the nation for its progress in consolidating networks and computing centers.

- As a central IT organization in a distributed environment, working with the agencies to provide a common services infrastructure. Major present capabilities are service broker, federated data dictionary, and an interface engine.

- Providing support through maintaining, developing, and supporting, as appropriate, enterprise applications such as e-mail, financials, human resource, procurement, expense reporting, and document management.

ITS does not receive appropriations from the General Assembly. It is fully funded through receipts for services provided.

ITS

2. LEGISLATIVE MOTIVATION
FOR STATEWIDE STRATEGIC IT INITIATIVES

Recognizing the increasing importance of information technology to the successful performance of state government, the North Carolina General Assembly enacted three major pieces of legislation in 1999 that impact considerably the management of technology investments: Session Law 99-0434: The Electronic Payment/Information Technology Act of 1999 (sponsored by Senator Eric Reeves); Session Law 99-237: 1999 State Budget (sponsored by Representative Ruth Easterling); and Session Law 99-0347: Information Resource Technology Commission Act of 1999 (sponsored by Representative William Owens, Jr.). The most important is the Electronic Payment/Information Technology Act of 1999, which fundamentally changes the structure and goals of ITS and mandates key initiatives. This legislation establishes a framework for ITS' future role that emphasizes the importance of an enterprise approach for the management of the state's technology assets. It supports the use of credit and debit cards, as well as electronic funds transfers in interactions with state government, an important factor in the state's ability to implement electronic government effectively. Information technology procurement responsibility also moves from its traditional location in the Department of Administration to ITS. The bill validates the unique nature of information technology procurement and the need for implementing procurement reforms. With the goal of ensuring that technology decisions are based on business needs, the bill requires IT portfolio-based management. The Legislation also points to a number of operational initiatives that need to be undertaken to achieve the goals of the legislation.

Information Resource Technology Commission Act of 1999 has a direct impact on ITS in that it formalized, in legislation, the official new name of the organization. The previous name, State Information Processing Services, reflects an earlier era in computing where data processing was the primary responsibility of the organization. Today, data processing is only a part of the expanding functions of telecommunications, enterprise management, and web

based services. The new name, Office of Information Technology Services, better depicts the expanding role of the organization. This legislation also implements the Information Resource Management Commission's (IRMC) project certification process.

The 1999 State Budget mandates the establishment of formats, contents, and guidelines, as well as the quarterly reporting of information technology budgets, costs, and staff positions. It emphasizes the need for fiscal accountability of the state's entire information technology budget, as well as the reporting of technology investment costs from conception through implementation, operation and eventual retirement/disposal (i.e., life cycle costs).

The Electronic Payment/Information Technology Act of 1999 mandates dramatic changes in management approaches, roles and responsibilities, relationships, financial and performance reporting, and accountability. The legislative intent is to strengthen the management of IT in state government by enhancing the accountability for expenditures and providing for more cost-effective investments, improving operational efficiency, and clarifying responsibilities for maximizing benefits from related assets.

The Electronic Payment/Information Technology Act of 1999 assigns the following powers and duties to ITS:

1. Procure all information technology for state agencies, except The University of North Carolina and its constituent institutions.

2. Submit for approval of the Information Resources Management Commission all rates and fees for common, shared state government-wide technology services provided by the Office.

3. Submit for approval of the Information Resources Management Commission recommended state government-wide, enterprise-level policies for information technology.

ITS

4. Develop standards, procedures, and processes to implement policies approved by the Information Resources Management Commission.

5. Assure that state agencies implement and manage information technology portfolio-based management of state information technology resources, in accordance with the direction set by the State Chief Information Officer.

6. Assure that state agencies implement and manage the information technology enterprise management effort of state government, in accordance with the direction set by the State Chief Information Officer.

7. Provide recommendations to the Information Resources Management Commission for its biennial technology strategy and to develop state government-wide technology initiatives to be approved by Information Resources Management Commission.

8. Develop a project management, quality assurance, and architectural review process that adheres to the Information Resources Management Commission's certification program and portfolio-based management initiative.

9. Establish and utilize the Information Technology Management Advisory Council consisting of representatives from other state agencies to advise ITS on information technology business management and technology matters.

3. KEY INITIATIVES FOR THE IMPROVED MANAGEMENT OF IT IN STATE GOVERNMENT THROUGH AN ENTERPRISE APPROACH

The ultimate goal of the Electronic Payment/Information Technology Act of 1999, the relevant portions of the 1999 State Budget, the Information Resource Technology Commission Act of 1999, and Governor Jim Hunt's initiatives is to use an enterprise approach in state government for: (1) accelerating the implementation of new and enabling technologies; and (2) improving the management of technology. This strategic direction is required for today's demands for cost savings in complex and rapidly changing technical and business environments, where citizens expect new types and higher levels of services from state government. Another digital divide may be emerging, one that contrasts the expeditious speed at which private industry is employing Internet technology to reduce costs and provide better services with the much slower pace of government to adopt this technology and exploit it to its fullest potential.

To achieve the two primary objectives, ITS is working closely with agencies, local governments, and business partners to implement six strategic information technology initiatives. Highlighted in the diagram below, these initiatives are closely linked, mutually supportive, and rely heavily on each other for success. They enhance, build upon, and manage the state's enterprise technical and business infrastructures and take advantage of the state's previous strategic initiatives.

Statewide Strategic IT Initiatives

State Business and Program Applications for Citizen Service

Statewide IT Infrastructure
(Common Business Models and Shared IT Resources and Applications)

Improved Management of IT in State Government through an Enterprise Approach
(Senate Bill 222, House Bill 253)

Digital Government
- Enterprise Infrastructure Development
  - Credit Cards
  - Digital Signature (PKI)
  - Portals (citizen, busines, employee, local government)
  - E-Forms/workflow
  - EDI
  - E-Procurement

IT Portfolio-based Management
- Budget/planning process
- Project certification
- Agency technical architectures
- Business cases for IT investments
- Applications inventories

IT Procurement
- Best value procurement
- Procurement rules, policies, procedures, and training
- Procurement reform
- Board of Awards
- Leverage volume purchases
- Contract management
- Leasing

Management of Distributed IT Assets
- Statewide plan
- Desktop management
- Tools for monitoring and administration
- Total cost of ownership
- Single point of contact
- Performance measures
- Distributed IT asset inventories
- Standards (hardware, software, communication equipment)

Financial Reporting
- Quarterly reports
- Annual budget/rates
- Reports to the Joint Select Committee on IT and the Fiscal Research Division
- Project Reports
- Investment life cycle costs

Privacy and Security
- Statewide approach
- Access control
- Identification/Authentication
- Data confidentiality
- Date integrity
- Non-repudiation

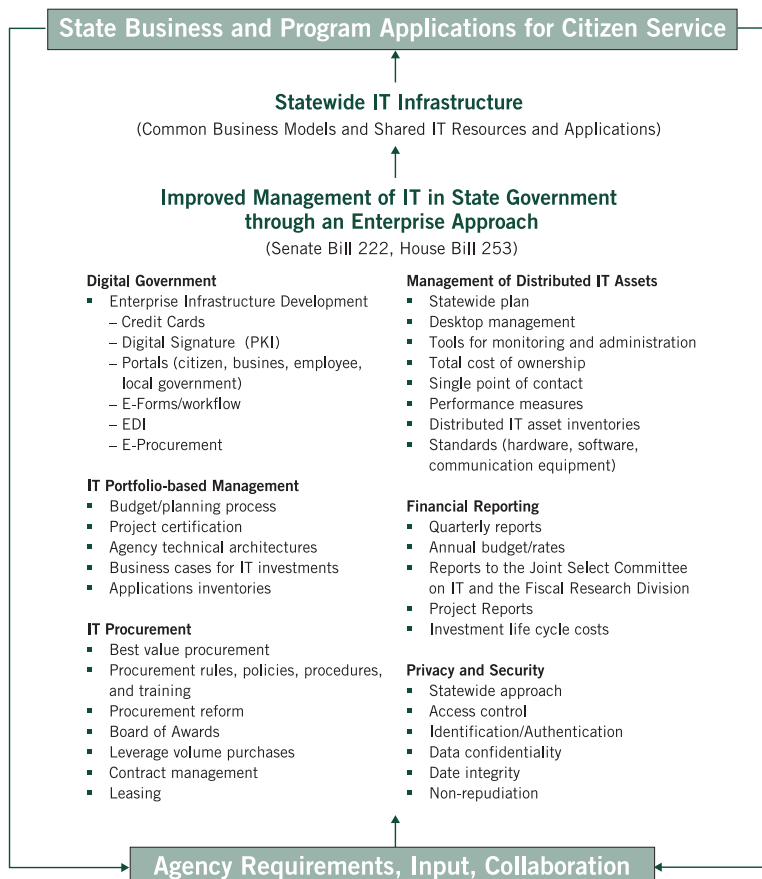**Agency Requirements, Input, Collaboration**

Figure 7: Improved management of IT in state government through an enterprise approach

ITS

Digital Government

Electronic commerce in the private sector involves the use of the Internet to expand interactions among persons or organizations to increase performance (higher quality, greater customer satisfaction, new products or services, etc.); enhance economic efficiencies (such as streamlined processes and lower costs); and establish quicker exchanges of information (speedier and more personalized service, etc). Digital government uses electronic commerce in the public sector in the same way as it is used in the private sector. The purpose is to implement the same technologies and identical or similar interactive approaches and business methodologies to serve citizens better and to enhance the democratic process.

North Carolina @ Your Service - ncgov.com

In February and April of this year, Governor Hunt made far-reaching announcements directing the expeditious implementation of electronic commerce in state government using an enterprise approach. These announcements addressed the "dot-comming" of state government with the launching of North Carolina @ Your Service - ncgov.com to streamline state government for North Carolinians and to provide its citizens with choices, convenience, and personalized attention through e-government. To implement this effort, in February, the Governor established the Electronic Commerce Steering Committee that is responsible for providing overall direction, leadership, and coordination of efforts for implementing his digital government initiative.
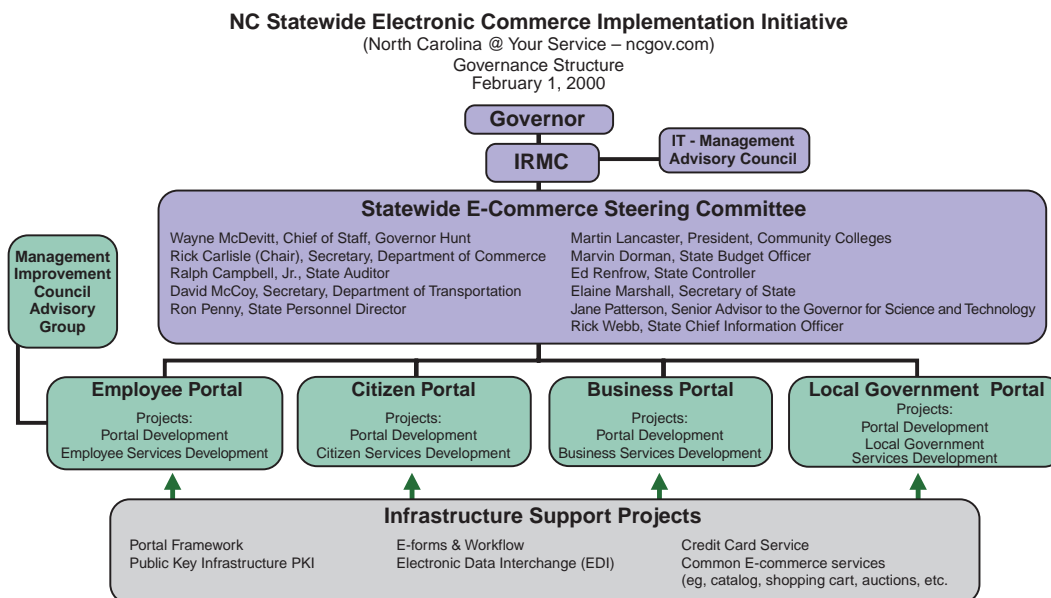
NC @ your service
www.ncgov.com

NC Statewide Electronic Commerce Implementation Initiative
(North Carolina @ Your Service – ncgov.com)
Governance Structure
February 1, 2000

Governor
IRMC
IT - Management Advisory Council

Statewide E-Commerce Steering Committee

Wayne McDevitt, Chief of Staff, Governor Hunt
Rick Carlisle (Chair), Secretary, Department of Commerce
Ralph Campbell, Jr., State Auditor
David McCoy, Secretary, Department of Transportation
Ron Penny, State Personnel Director

Martin Lancaster, President, Community Colleges
Marvin Dorman, State Budget Officer
Ed Renfrow, State Controller
Elaine Marshall, Secretary of State
Jane Patterson, Senior Advisor to the Governor for Science and Technology
Rick Webb, State Chief Information Officer

Management Improvement Council Advisory Group

Employee Portal
Projects:
Portal Development
Employee Services Development

Citizen Portal
Projects:
Portal Development
Citizen Services Development

Business Portal
Projects:
Portal Development
Business Services Development

Local Government Portal
Projects:
Portal Development
Local Government Services Development

Infrastructure Support Projects

Portal Framework
Public Key Infrastructure PKI

E-forms & Workflow
Electronic Data Interchange (EDI)

Credit Card Service
Common E-commerce services
(eg, catalog, shopping cart, auctions, etc.)

Figure 8:
North Carolina @ Your Service -ncgov.com Organizational Structure

ITS

The Statewide Electronic Commerce Steering Committee:

- Provides overall direction, leadership and coordination of efforts;

- Approves strategies, prioritize goals and objectives, and oversee progress and performance of a work plan;

- Reports to Governor Hunt and the Information Resource Management Commission on approaches, plans, status of projects, and accomplishments;

- Ensures a focus on customer service and attention to achieving more efficient internal operations within government;

- Recommends necessary changes to state statutes, policies and procedures; and

- Determines funding requirements and strategies.

The key objectives for implementing e-government in North Carolina quickly and economically while achieving the best results from a statewide perspective are:

- Determine a consistent and citizen-centric approach for citizens and businesses to transact business with the state.

- Develop a shared vision among all agencies for conducting electronic commerce, including common business models and a shared technical infrastructure.

- Create a standards-based approach for implementing electronic commerce applications.

The Governor's April announcement involved the introduction of the four state portals for providing a unified view of state government. He reaffirmed his commitment to using digital government to reduce bureaucratic barriers, increase efficiency, and provide added convenience by making state government resources more available in a user-friendly, electronic commerce-style environment. The four portals are citizen central, business central, employee central, and local government central.

Current Initiatives

ITS has the following North Carolina @ Your Service - ncgov.com projects underway as part of its digital government initiative:

- Establish an enterprise digital government infrastructure, as required in Section G.S. 147-86.20, that will include the capability for state agencies to transact business using credit and debit cards and other electronic payments. This is a significant change in how the state has done business. The Office of the State Controller will sign a contract establishing a statewide master service agreement and will establish policies and procedures for the use of this service.

- Develop a state portal to enable citizens and businesses to visit through a single entry point, rather than forcing visits to numerous independent agencies. In this way, individuals who routinely need something from the state, can easily access the specific information or services that they need regardless of the span of agencies the individual's needs cover.

- Establish ""employee central," a portal, that ensures that state government employees will no longer have to search through a multitude of systems or paper to access the services and information that they require. Similarly, it will become easier for the state to receive feedback from employees. A statewide survey was distributed to identify services desired by employees. It is anticipated that these desires will include travel planning services, expense reporting, leave reporting, training and benefits information, on-line policies, benefit plan access, etc.

- Establish a portal for local governments so that these entities can meet their unique needs for interactions with state government.

- Ensure appropriate security through a Public Key Infrastructure initiative for issuing and managing digital certifications. This initiative will also require policies and procedures for digital signatures so that agencies, employees, citizens, and businesses conducting transactions with the state fully understand the appropriate and effective use of this

![ITS logo]

powerful capability. ITS will provide common services and components for agencies to use in processing digital certificates.

- Implement Electronic Data Interchange as a pilot to demonstrate its feasibility in state government using the interface standard format to facilitate integration and consistent use of information across trading partners.

- Develop e-forms capability that can be used across multiple business line applications by establishing a master license agreement with a selected e-forms vendor.

- Manage an electronic commerce common services project to ensure that multiple agencies can use common or enterprise services rather than re-creating them multiple times at the agency level.

- Identify and implement an e-auction approach for both purchasing and selling functions.
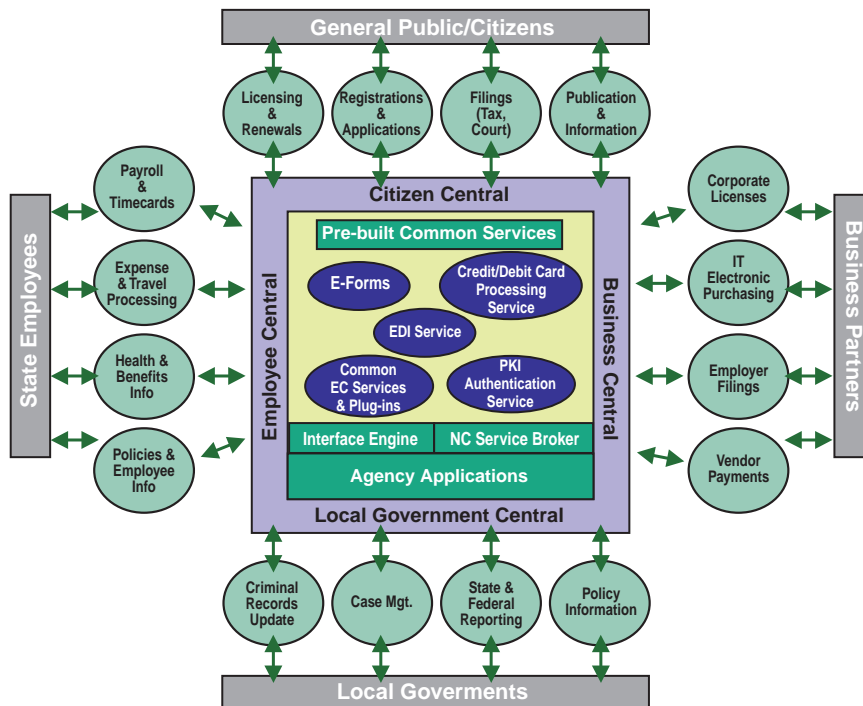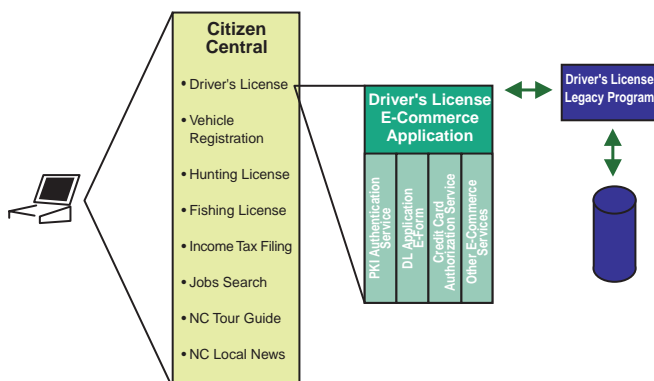

Figure 9:
North Carolina @ Your
Service -ncgov.com
infrastructure overview

ITS

Future Plans

The strategic direction of this initiative is to provide the state with a collaboratively developed electronic commerce infrastructure of common business processes and shared technical assets and services. The primary intent of digital government is to move state government expeditiously and economically through the stages of capabilities for electronic commerce. The first stage is a web presence, the next is citizen interactions, followed by web transactions. The final stage is business transformation achieved through the use of the Internet. Each stage is more complex than the preceding one. Each offers more sophisticated and complete capabilities for citizen self-service and provides greater potential for implementing productivity improvements and taxpayer savings.

The enterprise approach will develop the processes and infrastructures necessary for agencies to develop quickly and cost-effectively individual applications that: (a) Take advantage of the enterprise resources; (b) Receive the benefits offered by the advanced features of the statewide portals; and (c) Satisfy unique business and program needs. Under the enterprise approach, agencies have flexibility for designing and implementing individual applications that comply with the standards of the state's technical architecture and the statewide electronic commerce framework and infrastructure. The "one time - one way" paradigm is being followed to diminish duplication, reduce cost, and decrease cycle times for the implementation of applications.

Portfolio-Based Management of IT Assets

Technology is an inextricable part of virtually all business components. It is necessary to employ an integrated technology and business strategy setting with a planning approach that closely coordinates the two disciplines. Business and political initiatives need to be paramount considerations in identifying technology strategies and investments. Technology plans need to enable and support agency missions, program goals and business requirements. Few business initiatives can be implemented without technology, and few technology decisions can be made without an impact on business - a symbiotic relationship.

Portfolio-based management comprises the concepts, methodologies, and tools for assisting business leaders and technology executives to identify, analyze, and select technology investments that maximize the returns for the agency's and state's total technology portfolios and thus for the taxpayers. Portfolio-based management involves the following objectives:

- Ensure agency technology investment plans tie to business strategies and program goals.

- Assess future technology investments through cost/benefit analyses, technology and business risk assessments, and documented and approved business cases.

- Review and evaluate past technology investments and current assets for cost-effectiveness and performance in support of business operations and program objectives.

- Create and maintain continuous inventories of distributed IT assets in the state.

- Identify and select technology investments that comply with state and agency technical architectures, take advantage of the statewide technical infrastructure, and maximize the returns from state and agency technology asset portfolios.

- Prepare for approved and funded technology investments to easily transition to the IRMC's project certification and quality assurance program and the IT procurement process.

Portfolio-based management of information technology assets offers the following features and capabilities:

- It describes the concept underlying the identification, evaluation and selection of technology investments both on statewide and agency levels.

- It offers the "Applications Portfolio Management System" (APMS) and "Asset Insight" as planning tools. APMS is a comprehensive inventory of major applications. Asset Insight is an inventory of workstations, servers, and other distributed hardware assets and associated software. APMS and Asset Insight assist agencies in assessing the operation and

maintenance costs of present applications and hardware/software, determining the performance of these assets in meeting agency goals and objectives, and ascertaining the impact of new investments on the present portfolio of assets. Both APMS and Asset Insight assist technical managers in evaluating current applications and hardware/software assets, responding to cost/benefit and planning issues raised by agency business and program managers, and developing technology plans and replacement cycles.

- It streamlines and facilitates the interactions involved in the biannual planning and budgeting process among the agencies and central statewide functions, such as the Office of State Budget and Management, the Office of State Planning, and ITS.

- It connects the investment evaluation and selection activities with the project certification and quality assurance and technology purchasing processes.

Current Initiatives

The Office of State Budget and Management, Office of State Planning and ITS have cooperatively developed an integrated biennial business and technology planning process. All agencies must complete an agency technical architecture. Expansion budget request for technology investments over $200,000 or any hardware assets must be justified. The graphic below describes the major steps in the biennial planning and budgeting process.

Figure 10:
IT Strategic
Planning Cycle
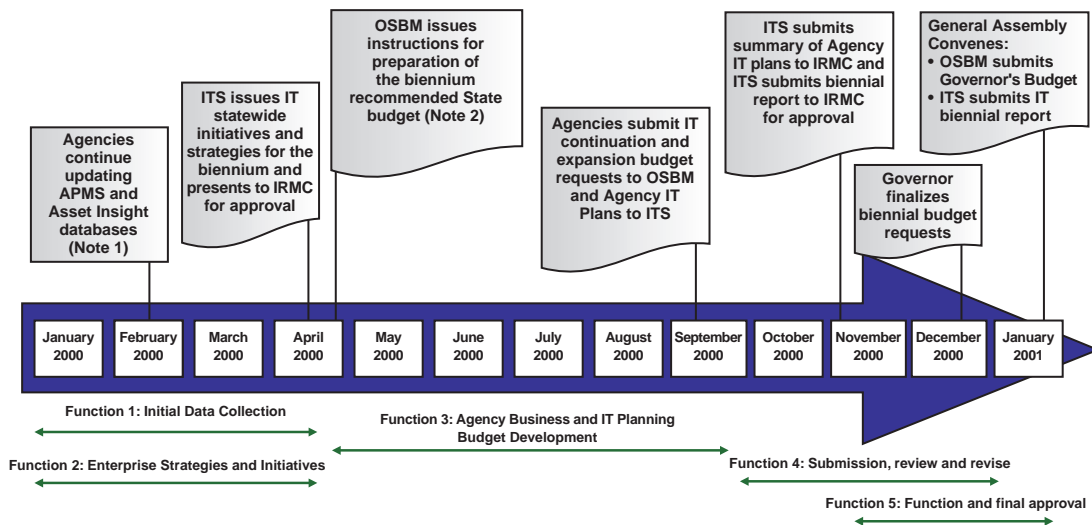
Note 1: Carry over from Y2K activities
Note 2: Includes a chapter from ITS with format and instructions for submitting agency technical architectures and agency technology abudget request.

Future Plans

Initial entries for both the APMS and Asset Insight inventory systems came from the Y2K work. Over time, agencies will update these inventories, and they will begin a process of ongoing technology planning. This 'continuous planning' concept is necessary for updating statewide and agency technology assets with changing application models (e.g., e-commerce model), taking advantage of new and emerging technologies, maximizing returns from present assets, and preparing for new business requirements. In the new planning paradigm, planning is necessary in order to be prepared for technology and business changes - not to react to them. Accordingly, continuous planning is necessary for continued preparedness and to assure taxpayers that the state has solid investments in its technological infrastructure.

IT Procurement

Recognizing the essential nature of procurement reform, particularly in the IT industry, and with an understanding that procurement is an inextricable component of improving the management of IT in the state, the Electronic Payment/Information Technology Act of 1999 shifted responsibility for the procurement of IT assets in the state to ITS.

Technology's rapid changes, the associated transformation of vendors, the increasing importance of technology to the success of the enterprise, and the taxpayer commitments for technology investments have increased the importance of the purchasing function for effective IT management. Purchasing has significant influence on the ability of selected investments to provide the expected benefits and to meet operating performance objectives. A typical investment is implemented, supported over its useful life, and then retired. Improper purchasing decisions result in excess costs and unrealized benefits for the life of the investment - not just for the implementation effort.

Procurement Reform

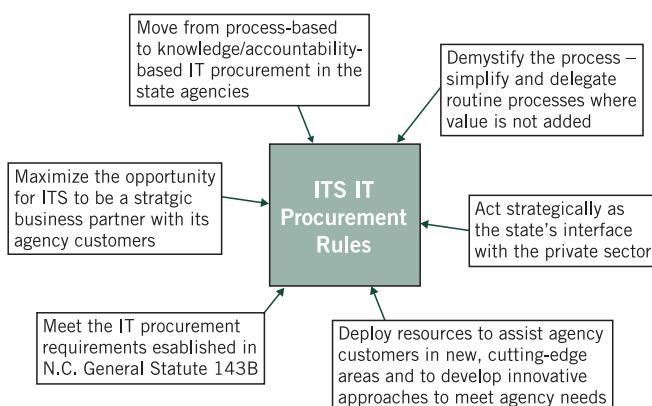### Enterprise Management of IT Assets

Figure 11: Procurement Reform

To meet the more challenging opportunities and more stringent accountabilities presented by a changing environment, the ITS IT purchasing function is adapting new concepts, practices, and approaches as follows:

- Apply the "best value" approach to procuring goods and services. This considers the total cost of ownership (installation to retirement) of assets, offers flexibility for vendors to propose creative solutions to business needs, and recognizes cost as only one (albeit an important one) of the many factors that must be evaluated in selecting a product or service vendor.

- Aggregate demand from multiple sources, where feasible, to obtain maximum volume discounts.

- Enforce compliance with enacted standards to ensure products operate as prescribed and work together as desired.

- Ensure knowledge-based procurement. Technical design, system operations, contract negotiating, contract management, vendor research, and legal review must be closely integrated.

- Establish partnerships with customers to understand their requirements and expectations in the purchasing arena. This promotes streamlining and simplifying the purchasing process. As a result, purchasing is better coordinated with other planning, budgeting, and project approval activities and the cycle time for completing the purchasing activity is reduced.

ITS

- Institute a shared partnership with vendors so they have a financial stake in the successful outcome of each application project or other technology investment.

- Research and implement an e-procurement solution to facilitate the implementation of these concepts, practices, and approaches.

Current Initiatives

To comply with the extensive requirements of the law, ITS has established a Statewide IT Procurement Office. The Statewide IT Procurement Office is committed to a best value approach in its procurement activities. To establish the office, ITS hired a Chief Purchasing Officer and staff to support the statewide procurement of IT.

The Secretary of Commerce established and promulgated procurement rules based on best value and procurement reform principles. Temporary rules were effective January 1, 2000, and have the full force of law. The permanent rules were approved by the Rules Review Commission in its March 2000, meeting and await approval by the legislature. To ensure agencies are able to appropriately implement the rules, policies and procedures are available and the Statewide IT Procurement Office provides training in a number of different venues.

The legislatively required procurement endeavor also is designed to ensure that procurement is an integral component of the improved management of information technology in state government To achieve this, it is necessary to begin to explore leveraged buying for IT purchases as well as to consider total costs of ownership. The procurement office is also responding to the demands for increased flexibility in purchasing, for example through establishing leasing agreements. Leasing options significantly expand agency alternatives for maintaining standard desktops, consistency, and currency with technology.

To track procurement contracts and, more specifically, to manage a leasing program effectively, it is necessary that an asset management system be available with robust contract management functionality. The functionality will enable better management of software licensing; allow for understanding of the terms and conditions under which items are purchased; provide the capability to know the maintenance commitments associated with the contract; and, especially significant for leased items, offer an understanding of any configuration changes to the asset. The asset management system will serve as a repository for asset data and will contain asset tracking data, portfolio data, and contract tracking data. In addition to IT procurement, portfolio-based management of IT assets, and IT enterprise management will be consumers of data in the repository.

ITS and the Division of Purchase & Contract are working cooperatively to ensure a smooth and seamless transition of procurement responsibility. Moreover, ITS recognizes and values the Division of Purchase and Contract's experience and is working closely with them to learn from them.

Through the transition process and afterward, ITS recognizes that communication is of paramount importance. To this end, ITS has offered training, facilitated focus groups, conducted individual interviews, and solicited feedback at every opportunity. ITS has also established a procurement Web site to provide agencies with information about the process, how it is being implemented, and its current status. The Web site also provides an opportunity for visitors to the site to provide feedback and to ask questions. The URL is www.itp.its.state.nc.us.

Future Plans

As the state continues to implement an enterprise approach, the ability of the IT procurement organization to achieve leveraged purchasing power, negotiate better contracts, provide improved services to state agencies, and achieve more effective relationships with vendor partners will increase exponentially. The Statewide IT Procurement Office will negotiate new term contracts with best value incorporated into the contract. It will expand the base of term contracts so that increasing numbers of items can be purchased from term contracts, thereby eliminating time consuming solicitation processes. The Office will be the pilot for implementing an e-procurement solution for IT purchasing. The Office will continue to provide training and other needed customer services. As technology advances at its

historical, breakneck speed, the Statewide IT Procurement Office, with its strategic location within ITS, will be well positioned to help the agencies navigate through complex areas and to provide all of the necessary knowledge and expertise for procurement. Moreover, ITS' understanding of the agency's strategic direction as developed as part of the IT portfolio-based management effort will be valuable to procurement efforts.

IT Enterprise Management

The rapidly changing nature of information technology over the past decade has transformed the hardware/software infrastructure from a static environment of mainframes located in central data centers to a dynamic environment in which personal computers, printers, servers, mobile communication devices and communications equipment are physically located throughout an enterprise. While creating opportunities to improve and streamline government processes and customer support, tremendous investments in equipment, staff, and support personnel are involved. The more distributed nature of these IT investments and their complex technical infrastructure, makes it much more difficult and costly to administer, manage, and assess value. It is imperative, therefore, that organizations develop processes to manage these assets efficiently and ensure their applications align with business goals, objectives, practices, and efficiency for taxpayers.

The purpose of IT enterprise management is to establish a state government-wide approach for managing distributed information technology assets to minimize total life cycle costs of assets while realizing maximum benefits for transacting the state's business and delivering services to its citizens. The Electronic Payment/Information Technology Act of 1999 asks ITS to work with the agencies to develop and implement IT enterprise management in the state.

IT enterprise management is the practice of constructing and coordinating operational functions across organizational and geographic boundaries to provide service and support for distributed IT assets with maximum benefits and minimized cost. These distributed IT assets, as defined in the legislation, the Electronic Payment/Information Technology Act of 1999, are hardware, software, and communications equipment not classified as traditional mainframe-based items. They include personal computers, local area networks, servers, mobile computers, peripheral equipment, and other related hardware and software items. IT enterprise management includes creating and implementing a statewide approach for operating and maintaining distributed IT assets throughout their lifecycle - from acquisition to retirement. It includes defining and implementing a plan for the necessary government-wide infrastructure and services for managing the state's distributed IT assets. This includes developing appropriate standards, processes, and procedures that will minimize the total cost of ownership while maximizing value.

An effective enterprise approach to managing the state's complete IT environment requires a variety of enterprise and infrastructure initiatives. With each management service operating effectively, strategic planning becomes easier because of the ready availability of reliable data to feed the planning process. Effective operations also is key for the implementation of the rapid development life cycle required by e-government. IT enterprise management is a component of IT operations management which encompasses all of the operational support ITS has historically provided and for which there are methodologies and structures in place. Through providing hardware, software, and service related infrastructure support and a platform for collaboration among the components of the enterprise, enterprise management assists agencies by enabling them to focus their resources on those IT components that are uniquely related to their specific business requirements.

Core Components of IT Enterprise Management

Acquisition Services (Performed by IT Procurement)	Inventory/Tracking Services (Performed by Portfolio Management)	Consolidated Service Center	IT Management Services

• Procure IT assets
  • achieve volume discounts
  • manage vendor's quality and delivery schedule
  • ensure configuration compliance by vendors
  • manage contracts
• Deploy IT assets
• Implement "best value" concept
• Employ financing opportunities (leasing)
	• Development hardware and software asset inventory
	• Track the install, move, add and change activities for IT assets
	• Provide accurate and timely decision info:
	  • what do I have?
	  • what did it cost?
	  • where is it?
	  • what is inside?
	  • what does it support?
	  • what are its capabilities
	  • how old is it?
	  • what is its maintenance history?
	  • how much does it cost to keep it?
		• Provide a Single Point of Contact for all end user calls regarding IT assets (e.g., order install, problem repair, move, change support)
		• Set and monitor agency expectations for IT services
		• Solve problems
		• Perform requirements planning and coordination for technology upgrades and other agency support requests (e.g., program expansions, building moves, etc.)
			• Deliver Health and Performance Management
			• Deliver Event and Service Level Management
			• Deliver Desktop and Server Management
			• Deliver Distributed Operations Management

Supplemental ITS Enterprise Management Functions

IT Business Relationship Services • Identify agency business and program strategies • Align IT Services to business and program objectives	IT Enterprise Program Management Office • Project planning and control • Administrative management • Data/communications management • Quality/material management

Figure 12: Core Components of IT Enterprise Management

IT enterprise management is effective because it consistently applies the standards and best practices of the Statewide Technical Architecture when implementing the state's distributed information infrastructure. It improves customer interfaces by establishing a Consolidated Service Center that provides operational support, develops business level views of ongoing services and measures of their effectiveness, and provides a single point of contact to facilitate customer service and ensuring customer needs are understood and met. This infrastructure enables the establishment of IT management services that free agencies to focus on improving business functions while facilitating the streamlining of costly IT support requirements and enhancing IT value at all levels across the state. It provides business relationship services to assist in meeting agency needs and coordinates and streamlines efforts through a program management office. These processes closely align and integrate with the overall IT operations management, IT procurement, and portfolio-based IT management.

Current Initiatives

In 1999, ITS conducted an extensive study with the assistance of an industry leader in enterprise management consulting, to assess the current IT management posture at ITS and develop recommendations on how to proceed. This exhaustive effort included hundreds of interviews with IT experts from across the state and its agencies. It examined all aspects of ITS and agency management, operations, products, and services with a focus on how best to evolve from a user of IT to a true manager of IT. The study provided high-level recommendations and a framework for implementing a statewide approach to

managing distributed IT assets. It incorporated several ongoing initiatives and provided a roadmap for integrating them with additional management tools and processes to form a complete asset management system. Leveraging internal expertise and ongoing projects, ITS has begun implementing elements of the study's recommendations:

- Establishing a program management office dedicated to the oversight and management of this and other operations management initiatives.

- Implementing a network management capability that provides business level views of the entire statewide network and the management tools necessary to address network requirements, assess additional needs, and handle operational issues as they arise.

- Developing an Enterprise Management of IT Assets chapter in the Statewide Technical Architecture to provide an overview for the framework of an enterprise management of distributed IT assets effort and to link planning for the component infrastructure with the technology that is and will become standards in this area.

- With the procurement function within ITS, ITS technical, business, and purchasing staff will work closely together to ensure that business needs are met efficiently with the optimal technical solution.

- Developing a management of distributed information technology assets plan for submission to the Information Resources Management Commission. Subsequent to Information Resources Management Commission approval, ITS will work collaboratively with agency partners to implement the plan.

Future Plans

ITS will devote significant effort to implementing information technology enterprise management for the state. The development of a comprehensive implementation plan will tailor the recommendations from the study referenced above to meet the unique needs and requirements of the state of North Carolina. This will provide a clear direction and associated timeline for establishing a framework within the government. The plan will provide the structure, policies, and processes for IT enterprise management while taking advantage of in-house expertise, leveraging current capabilities, and identifying additional support requirements. The business requirements that define state government support to its citizens will be incorporated to create a comprehensive system with the flexibility to adapt to unique requirements.

Depending on the exact content of the plan that is developed, future projects may include such initiatives as:

- Establishing a single point of contact (service or help desk) for problem reporting and other service requests (move, upgrade, etc.). While ITS currently provides help desk support, the move towards a single point of contact will provide a dramatic increase in customer service and satisfaction. This will enable ITS to effectively meet customer business needs through technology solutions rather than merely to solve technical problems. The single point of contact will work with clients to identify the particular "bundle" of services they require and ensure that components are complementary, work correctly together, and meet business needs.

- Defining performance measures and a tracking and reporting system to monitor the responsiveness and quality of maintenance, repair, and other support services. Through service level agreements, the help desk, and other tools, ITS will monitor its metrics, establish acceptable performance standards, and provide management data on performance to monitor quality more effectively.

- Creating technical specifications and enterprise homogeneity of products to simplify purchasing and maintenance tasks and reduce ongoing support costs. Employing monitoring and support software to automate the ongoing status reporting of components and to minimize personnel resources needed for software installations, upgrades, and replacements for hardware and communications equipment. More automation offers better services and lower maintenance and support costs, thus saving taxpayer dollars.

ITS

Financial Reporting

A necessary component for the management of information technology investments is the knowledge and understanding of all relevant costs. To accomplish this objective, state law has mandated two specific areas of reporting. First, a complete statewide report of total information technology expenditures must be developed. Second, costs for major technology investments must be identified and reported from budgeting through the life cycle of implementation, operation/maintenance, and finally retirement/disposal. ITS, the Office of the State Controller, the Office of State Budget and Management, and the Office of State Personnel are working together to design a cost-effective process that facilitates management reporting.

With respect to reporting statewide information technology expenses, the Office of the State Controller has developed an Information Technology Expenditures Report that combines information from the state's Personnel Management Information System and the North Carolina Accounting System and is issued quarterly. This comprehensive report offers budget and actual expenses for information technology operational accounts by major categories, such as contracted personal services, hardware, software, information technology supplies, telecommunications and networking services, and mainframe services. Software is divided into purchase/development and maintenance. Hardware is subdivided into telecommunications and IT. Purchase, maintenance/repair and rent/lease costs are segregated for these major categories. Extensive budgeted and actual personnel costs and staffing information are provided.

There are new life cycle reporting requirements for major information technology investments. Beginning July 1, 2000, all technology projects with an estimated cost of at least $2 million are required to be separately identified in an agency's budget through unique budget fund codes(s). In addition, operational/maintenance costs for current applications that were determined to be "mission critical" for Y2K are being collected and reported. These costs will be maintained in separate ledgers, so that they can be reported on current period, year to date, and life to date (cumulative project) bases. Types of costs that will be collected and reported include: personnel services,

training, contracted services, hardware, software, telecommunications, mainframe services, supplies, and other.

Current Initiatives

Since August 1999, the Office of the State Controller, the Office of State Budget and Management, the Office of State Personnel, and ITS have been working together to determine the best method of gathering the necessary information from the central accounting, budgeting, and personnel systems to support the intent of legislation mandating improvements in the financial reporting for information technology expenditures. Types of projects and applications for reporting have been identified and necessary fund, project, and account codes are being developed. The quarterly Information Technology Expenditures Report is being evaluated to improve completeness, accuracy and presentation.

Future Plans

Refinements are being developed for present and envisaged reporting for statewide information technology expenditures and life cycle technology investment costs. Project selection thresholds, cost categories, methods of collecting data, and reporting formats and frequencies are under review.

Privacy and Security

The confidentiality of records and the privacy of individuals are concerns for citizens, employees, customers, and suppliers. The emergence of the Internet and the rise of distributed technology components have compounded concerns regarding privacy and security. Security requirements have shifted from expectations and requirements in the mainframe-based environment. People expect assurances that the virtual marketplace is a safe, secure place to purchase goods and services and to receive and give digitized information. Citizens have many dealings with government. Therefore, it is imperative that confidential data is well protected when it is communicated digitally and when it is stored in databases.

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Enterprise-wide Security Strategy

Distributed Security

Non-repudiation — Prohibits the recipient of a message from denying having received it or disallows the sender from denying having sent it

Data Integrity — Guarantees that data has not been changed since its last official update

Data Confidentiality — Encrypting the data provides confidentiality that is necessary for transmitted information

Identification & Authentication — Determines who is connecting with the particular host, server, or workstation

Access Control — Determines what data or applications an authenticated user can reach
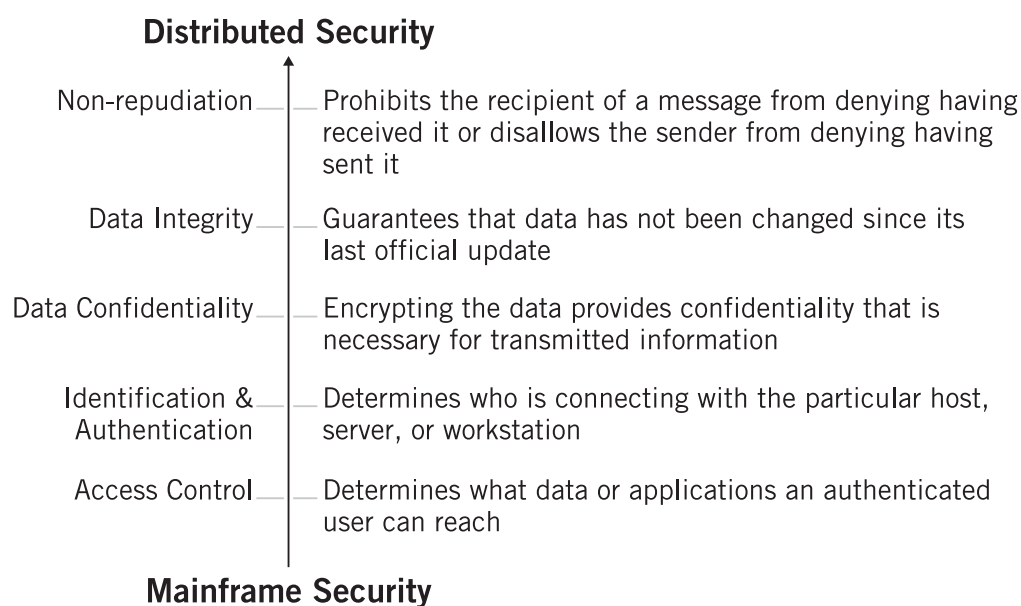
Mainframe Security

Figure 13: Enterprise-wide Security Strategy

The key objectives for security in this environment are to provide the following capabilities:

- Access control to determine what data or application can be reached or used by an individual;

- Identification/authentication to determine the real identity of the person requesting access to data or an application;

- Data confidentiality to prevent unauthorized disclosure by encrypting data;

- Data integrity to guarantee that data has not been changed by an unauthorized person; and

- Non-repudiation to ensure the parties to a transaction can not dispute their participation in the transaction.

These capabilities can be obtained by developing relevant policies and implementing appropriate processes and technologies, including public key infrastructure and network security.

Current Initiatives

Recognizing that security must be addressed at the enterprise level, not at the level of the individual application, ITS implemented a Security Office that supports all aspects of business continuity and business recovery planning to provide secure operational continuity. Business contingency planning activities include business impact analysis, risk assessment, and recovery planning. ITS realizes the increasingly important role of a secure operation to e-government. Therefore, ITS has selected several security related, strategic initiatives such as public key infrastructure to prepare to meet clients needs and to best serve tax payers.

The ITS Security Office oversees a comprehensive security program to provide a secure operational environment for clients that complies with the statewide technical security architecture, security policy, industry best practices and legal and regulatory requirements.

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The groundwork for a security infrastructure was developed as part of the Electronic Commerce Work Group Technical Architecture and Security Infrastructure Task Force effort. Among the results was recognition that security has enterprise wide implications and the resulting requirements to establish an enterprise wide security infrastructure. The need for a security infrastructure has been reinforced by federal initiatives. The task force developed architecture has been the basis for a series of security initiatives.

The Network Perimeter Security Committee has been resolving perimeter security policy issues over the last two years. The Statewide Network Security-Criminal Justice Information Network project has designed a security infrastructure that was approved for adoption by the Criminal Justice Information Network Governing Board and is considered as a model for the development of a statewide security implementation. The strategies include firewall technology, cryptographic technology including virtual private networks for remote access, and authentication and authorization based on digital certificates and directory services. The work in these projects is the basis for a statewide Remote Access effort based on virtual private network technology.

The Criminal Justice Information Network agencies have instituted a Security Oversight Committee to establish policy for its constituent agencies. The Security Oversight Committee will ensure a consistent approach to security across its membership and determine priorities in implementing security. The Information Protection and Privacy Work Group worked on establishing security policies that will be consistent across state government and in cooperation with local government and private industry. The work group endorsed the security strategies developed as part of the Statewide Network Security-Criminal Justice Information Network project.

The technical architecture and Criminal Justice Information Network projects highlighted the importance of developing an enterprise wide public key infrastructure to support digital certificates as a security technology. The North Carolina e-commerce act of 1999

extended the uses of digital certificates into the commercial arena by approving business transactions between government and private enterprises based on electronic signatures.

The efforts from the projects described above are currently coordinated and are setting the baseline best practices to be adhered to in protecting the state's systems, networks, and other Information Technology resources.

In summary, the state of North Carolina has a coordinated statewide effort in: (a) Establishing security policy; (b) Designing a common strategy; and (c) Implementing enterprise wide security such as a Firewalled perimeter, public key infrastructure, remote access and other security implementations.

Future Plans

North Carolina is continuing to develop its enterprise security infrastructure. The major efforts underway include:

1. In 2000-2001, a public key infrastructure will be in place to support authentication and facilitate e-commerce.

2. A security implementation for the criminal justice agencies will be rolled out and will be completed in June 2001.

3. Security Policies will continue to be developed by the Information Protection and Privacy Committee

4. Network perimeter security will be in place based upon statewide policies established by the Information Protection and Privacy Committee.

5. Secure access by local government to state resources will be supported by a Remote Access strategy based on Network Perimeter Security Committee and Criminal Justice Information Network designs.

State agencies and local government entities are expected to coordinate their efforts in security with the initiatives underway.

4. SUMMARY

While each of the six initiatives for the enterprise management of information technology can be described separately, they are, in fact, inextricably linked. Each has its individual goals, objectives, processes and supporting tools, but each is tied to and depends on the others for success. More importantly, all are required to obtain the synergy necessary for achieving the improved management of information technology. With the six, the whole is greater than the sum of its parts - without any one, the enterprise approach will fail.

Digital government is the primary driver for the other five, and it can not be accomplished without them. E-government is the use of the Internet and other technologies to provide cost-effective services to citizens in the manner, times and places they expect. It has increased the need for the more sophisticated management of technology and the use of new and better management practices for planning, implementing and operating technology.

Portfolio based management of IT assets involves the concepts required to identify, evaluate, and select technology investments that most effectively meet agency and state requirements for providing the best public services in the most economic manner. It is composed of inventories and other tools, processes, and principles. It is dependent on financial and asset performance reporting for information to make decisions, and it is a key contributor to the procurement of IT assets - hardware, software and other items. Planning is undertaken to achieve preparedness for the future - which is ever changing.

Procurement is the first point of contact for technology assets and services. Best value concepts are used to balance quality and cost aspects of purchases. Procurement must consider total life cycle costs. If done well, purchases will be at the lowest cost possible that also provides the least implementation, operation/maintenance, and retirement/disposal expenses, as well as the greatest benefits. Specifications for distributed IT assets are provided to procurement from the IT enterprise management initiative.

IT enterprise management is the tools, best practices, policies, and procedures for lowering the total cost of ownership for distributed technology assets. These costs include: (a) capital (for example, purchase/implementation price); (b) technical support (such as install, monitor, fix, update, maintain, etc.); (c) administrative support (e.g., purchasing/contracting); and (d) end user (training, assistance, etc.).

Financial reporting is necessary for managing the performance of technology investments and distributed technology assets and providing accountability for these expenditures. It provides fiscal data for evaluating past investments as part of portfolio management, determining the cost-effectiveness of the practices used to manage distributed technology investments, and identifying the results and efficiencies of technology management policies and procedures. It includes life-cycle costs for major technology investments, as well as ongoing total statewide expenses for all categories involved in the management of technology.

Security is an essential component for digital government. Citizens must trust the integrity of transactions, the confidentiality of data, and the privacy of records. Policies, best practices, standards, procedures, tools and infrastructure are required to achieve the acceptable level of information protection and privacy to effect e-government and protect the state's information and hardware/software assets.

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	Initiative	Summary	Results
e-government	North Carolina @ Your Service	Makes use of web based technologies and Internet communications to change the ways government operates and interacts with citizens.	Provides better, more cost effective, and convenient services to citizens and provides opportunity for reducing operating costs.
Enterprise Approach to IT Management	IT Portfolio Based Management	Links IT investments with political priorities and program strategies. Provides tools to monitor and manage using portfolio management techniques.	Ensures that IT investments meet the state's business and program needs through selecting the right investments and monitors and manages investments.
	IT Procurement	Ensures that the state buys the best goods and services at the lowest total life cycle cost.	State maximizes its IT investments by taking advantage of volume discounts and best value evaluations.
	Privacy and Security	Provides the policies, procedures, and technical infrastructure to ensure the confidentiality of data, the privacy of records and the integrity of communications.	Employees and citizens are confident that they can transact business with the state in a reliable and secure manner.
	IT Enterprise Management	Policies, procedures and technical infrastructure for managing the state's tremendous investment in distributed IT assets such as workstations, servers, routers, etc. to minimize total life cycle costs.	The state will be able to implement e-commerce and other initiatives and will be able to provide maximum benefits to its citizens in the most economic manner possible by minimizing costs and maximizing benefits in its distributed assets.
	Financial Reporting	Provides quarterly budget and expenditure information for major categories on a statewide basis (i.e., total statewide budgets and costs). Also provides total life cycle costs from implementation through retirement/disposal for major IT investments and assets.	Provides comprehensive financial information to the level of detail necessary to evaluate the performance of IT investments on a statewide basis. A key provider of accountability of the results of investments for the General Assembly, executive branch leadership, and the public.

The convergence of the initiatives described above is necessary to succeed in the new IT environment. Through selecting the right investments, buying products and services as efficiently as possible, managing the distributed environment effectively, and ensuring privacy and security are maintained; ITS can work in collaborative partnerships to meet the objectives established for the state. These systems and services provide a cost-effective way to assure taxpayer dollars are spent effectively for information technology.